

RESECTION OF THE ILEO-CÆCAL COIL OF THE  
INTESTINE; ITS INDICATIONS, RESULTS, AND  
MODUS OPERANDI, WITH A REVIEW OF  
ONE HUNDRED AND TWO RE-  
PORTED CASES AND TWO  
HERETOFORE UN-  
PUBLISHED.

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L ICHTENSTEIN, from a study of 154 cases of primary carcinoma of the digestive tract, excluding the stomach and rectum, gives the following results: Flexura sigmoïda, 42; colon descending, 11; colon transverse and the two adjoining flexuræ, 30; colon ascending, 6; ileo-cæcal coil (cæcum, appendix vermiformis, and valvula ileo-cæcalis), 32; small intestine, 33.

Thus showing the ileo-cæcal coil occupied by primary tumor as frequently as the entire small intestine, and more than any other intestinal region beyond the immediate vicinity of the rectum.

It is, then, not to be wondered at, that the first resection of the ileo-cæcal coil (Krausshold, 1879) occurs contemporaneous with the first excisions of the intestine for cancer in modern surgery (Billroth, 1879; Czerny, 1880).

The history of the resection of the ileo-cæcal coil is interesting in many ways. At first an operation of last resort, its results were fatal in each case. The progress of abdominal surgery, the skill of the surgeons demonstrated its possibility little by little.

CHRONOLOGICAL TABLE OF RESECTIONS OF THE ILEO-CAECAL COIL.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	? Mo.	Total.	PER CENT. MORTALITY.		
															General.	Neo-plasm.	Tuber-culosis.
1879	..	..	..	28	..	..	..	..	..	..	..	..	..	1	100.00	100.00	..
1880	..	..	..	..	..	..	..	..	..	..	..	..	..	0	..	..	..
1881	..	..	..	..	..	..	..	4	..	..	..	..	..	1	100.00	100.00	..
1882	..	..	..	..	..	..	32	..	..	..	..	..	..	1	0.	0.	..
1883	..	..	..	..	..	..	..	..	..	..	..	..	..	0	..	..	..
1884	..	..	5	..	..	41, 73	..	..	44	..	..	42, 82	..	6	50.00	50.00	..
1885	..	..	89	..	..	..	..	..	35	..	..	..	..	2	0.	0.	..
1886	..	..	6	..	7, 8	53	..	23	..	..	86	..	..	6	33.33	50.00	0.
1887	15	..	88	3	..	37	70	..	..	..	68	50	..	6	33.33	66.66	0.
1888	..	54	..	..	83	..	..	..	..	..	91, 97	..	2	6	0.	0.	0.
1889	..	..	..	..	9, 31 60, 85	..	46, 47	61	78	40	77	48, 98	..	12	33.33	33.33	20.00
1890	..	10	71	..	11, 66, 99	55	..	..	..	16, 63	..	76	..	9	44.44	66.66	33.33
1891	38	39, 49	..	..	..	94	58	33	..	..	27, 67	62, 100	..	10	10.00	25.00	0.
1892	80	102	51, 101 59	..	57, 79 56, 69	..	..	..	14, 20	..	52	..	..	12	27.27	50.00	16.66
1893	21, 29	22	..	17, 87	90	..	24, 39 79, 93	42	1	36, 64	65	19	..	16	20.00	0.	50.00
1894	92	..	..	..	25	= 2 cases in 1894.			..	..	..	..	2 + 12 = 14	Total = 102			

Date not known = 12, 13, 18, 26, 34, 43, 73, 74, 75, 84, 95, 96 = 12 cases.

The numbers in the squares represent the case numbers to be found in the statistical table. Numbers 1 to 45, inclusive, are cases operated for neoplasm. Numbers 46 to 69, inclusive, are cases operated for tuberculosis.

The cases of neoplasm are by years.												Total.		
1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893
The cases of neoplasm operated =												1	3	4
The cases of tuberculosis operated =												2	6	2
												10	2	24

Six cases of cancer, time of operation unknown. One case of cancer operated in 1894 not here counted.

The first successful operation was performed by Maydl in 1882, and a reference to the chronological table will show the increasing frequency of the operation with its progressively diminishing mortality. In 1884, Czerny resects the ileo-cæcal coil for invagination, and finds the valvula cancerous. In 1886, resection is adopted by Wassilief for the cure of artificial anus, established for acute invagination. And the same year Czerny performed the first resection for tuberculosis. Maydl, in 1887, resects the coil for cicatricial stenosis, and Billroth for stercoral fistula, in 1888. In 1893, Clarke adopts resection for the treatment of irreducible cæcum in hernia.

#### GENERAL CONSIDERATION.

Other conditions equal, the surgical activity of nations is well indicated by their literature of the subject. From this point of view it may be interesting to classify by nationalities the published cases of resection of the ileo-cæcal coil. The language in which the publication is found is assumed to be the nationality of the surgeon. A rule which has its exceptions, however.

Of the 102 cases consulted, 66 are German, 13 French, 9 English, 8 American, 4 Italian, 1 Russian, and 1 Scandinavian.

The Germans are foremost in the field, to them belong two-thirds of the cases, the first operation (Krausshold); the first successful operation (Maydl); the first operation for tuberculosis (Czerny); for invagination of the cancerous cæcum (Czerny); for cicatricial stenosis (Maydl); and for stercoral fistula (Billroth). To these *pioneers*, as is frequently the case, is attributable the highest mortality.

Twenty-eight surgeons. Sixty-six cases, of which two having survived the resection, died of the second operation necessary to establish the continuity of the digestive tract. Deducting these two cases, the remaining sixty-four resulted fatally twenty-one times, a mortality of 32.81 per cent.

The ileo-colostomies were once made with absorbable plates (Von Baracz). The operations divide as follows: 28 for neoplastic infiltration; 16 tubercular affections; 6 invaginations of the cancerous cæcum; 6 chronic invaginations; 2 cicatricial

stenoses; 2 stercoral fistulæ each, the result of anterior operation; and 6 pyo-stercoral fistulæ. All published resections of this last class were done by German surgeons.

Four monographs by German authors treat the subject of ileo-cæcal resection very thoroughly. See Körte, Matlakowski, Sachs, and Salzer.

In French, thirteen operations by eleven surgeons are reported. The first successful excision of the ileo-cæcal coil by a French surgeon is reported by Bouilly, a resection for tubercular affection. The thirteen operations are divided into 3 for neoplastic affection, 7 tubercular, 1 chronic invagination, 1 inflammatory stricture, and 1 stercoral fistula, a result of hernia.

Thirteen opérations with four deaths, mortality, 30.77 per cent.

The subject is exhaustively studied in the monograph of Dr. Baillet, published this year.

Nine operations, by as many English surgeons, give two deaths, a mortality of 22.22 per cent. The operations classified as follows: 5 for neoplastic condition, 1 invagination of cancerous cæcum, 1 resection for irreducible hernia, and 2 for stercoral fistula resulting from gangrened hernia. Two of the nine operators terminated the intervention with anastomosis with absorbable plates, two others by implantation, using the rubber ring to aid invagination. Deducting these four cases operated by methods other than the usual suture, the mortality of five cases of intestinal union with sutures is 40 per cent.

Five American surgeons have removed the ileo-cæcal coil eight times: 6 operations for neoplasm, 1 for invagination of cancerous cæcum, and 1 for stercoral fistula resulting from a previous operation. Eight interventions with one death (Senn). Mortality, 12.50 per cent. One of the survivors died of a secondary operation by sutures to restore the digestive canal (Barton), and should, perhaps, be counted as a fatal result.

No study of the subject of resection, confined to the ileo-cæcal region, has been found in the English language.

Four Italian surgeons report cases of resection for neoplastic tumor, four operations with one death. Mortality, 25 per cent.

One operation each is published in Russian and Scandinavian tongues, both interventions successful.

It is to be remarked that monographs of the subject are limited to the Germans and French, and that outside of these two languages no mention of operation for tubercular trouble is found.

The lower mortality of English and American surgeons might be attributed to the neglect to publish unsuccessful cases; but the relation between the frequent use of absorbable plates or anastomotic button and the improved statistics is very striking. The mortality of the English cases, treated with intestinal suture, is found to be 40 per cent., that of the American cases, the death from secondary suture included, is 33.33 per cent. (three cases).

Considering only the operation, not employing plates, buttons, or invagination rings, the mortality by nations becomes German, 33.33 per cent.; French, 30.77 per cent.; English, 40 per cent.; American, 33.33 per cent.; Italian, 25 per cent. Whence it might be concluded that the improved total statistics of English and American surgeons are to be attributed to the superiority of plate or button methods employed by them, rather than to any superior individual skill, for the American cases treated in the same way—that is, adopted by continental surgeons—give a mortality identical with that of the German intervention. The mortality of English cases operated by suture processes is the highest of all nations. But the question of method can only be judged when considered in the discussion of statistical results of resection of the ileo-cæcal coil.

#### GENERAL SUMMARY.

During the fifteen years that have followed the first intervention, 102 cases of surgical operation that resulted in the resection of the ileo-cæcal coil are reported by fifty-eight surgeons, with sufficient detail for critical study. Twenty-nine of these cases terminated fatally, placing the general mortality at 28.43 per cent.

The variety of pathological condition which necessitated surgical interference is such that a general summary would give but

little aid in discussing the question of resection limited to this region of the digestive tract. Consequently, only classified statistics will be used.

*Classification of Cases.*—The classification of these cases is a difficult task, certain of them by reason of complication entering into more than one division. Great care has been taken to determine the predominating pathology of each, and thus decide its arrangement under the proper heading.

The cases are divided, and will be considered, as follows :

Class	I Neoplastic affection . . . . .	45
"	II Tubercular " . . . . .	24
"	III Invagination,—cancerous cæcum . . . . .	9
"	IV " —chronic . . . . .	7
"	V " —acute . . . . .	1
"	VI Stenosis,—inflammatory or cicatricial . . . . .	3
"	VII Hernia,—Irreducible cæcum . . . . .	1
"	VIII Stercoral fistula,—anterior operation . . . . .	3
"	IX " " —hernia : . . . . .	3
"	X Pyostercoral fistula . . . . .	6
Total . . . . .		102

Classes II and VI correspond very closely, and might be considered together. The same can be said of Classes VIII and IX.

The different condition of the patient at the time of operation is all that decided the distinction of these classes.

*Methods of Operation.*—Another distinction must be made according to the method followed by the operator. In fact, an examination of the clinical reports shows that the *modus operandi* is varied thus :

*Method 1.*—Resection with immediate suture.

- The end of the ileon of the same calibre as the end of the colon.
- The end of the ileon brought to the calibre of the colon by oblique section.
- The ileon terminal sutured into the colon, the calibre of which is adjusted by a V excision or T suture.
- Implantation of the end of the ileon into the side of the colon, the end of which is sutured and reduced into the abdominal cavity.
- Implantation of the ileon as above the colic terminal left in the abdominal wound, subsequently excised or closed by cicatrization.

*Method 1.*—(f) Invagination of ileon into the end of the colon, maintained by sutures.

(g) Lateral anastomosis, the ends of colon and ileon closed with sutures and reduced.

(h) Lateral anastomosis, the ends of the bowel left in the abdominal wound, subsequently excised, subsequently cicatrized.

*Method 2.*—Ileo-colostomy, with resection a second operation to remove the excluded coil (Maydl).

*Method 3.*—Creation of artificial anus,—after resection.

(a) Patient left with anus, and considered as cured.

(b) Enterotome to cure anus.

(c) Secondary suture.

(d) Implantation or invagination with the aid of a rubber ring.

*Method 4.*—Absorbable plates; lateral anastomosis.

*Method 5.*—Anastomotic button.

(a) End-to-end approximation.

(b) Lateral implantation, end of ileon into the side of the colon.

#### GENERAL STATISTICS.

*Age, Sex, Mortality.*—Of the total number of cases, ninety-six give the sex of the patient; of these thirty-five were females.

Eighty-nine reports note the age, the youngest four years, the oldest sixty-seven, both males. Average age thirty-seven years.

Thirty-five resections of the ileo-cæcal coil, the patients, females, give eight deaths; their mortality is therefore 22.86 per cent.

The same operation performed sixty-seven times on the male resulted fatally in nineteen cases. Male mortality 31.14 per cent.; almost half as much again as that of the females.

#### CLASSIFIED STATISTICS.

*Class I. Neoplastic Affections.*—Resection of the ileo-cæcal coil has been performed 45 times by 34 surgeons, for affections of this class.

Forty-four cases, noting the sex, give 15 females, 29 males.

Forty-two cases which report the age show an average of 43.5 years, the youngest five, the oldest sixty-seven; both males.

Fifteen fatal terminations; mortality 33.33 per cent.

Of the 15 females 4 died; their percentage of death is less

than that of the operation, being only 26.66 per cent. While of the 29 males, 11 fatal results give a mortality of 37.93 per cent.

Again the severe mortality of the male is to be noted in comparison with that of the female. Let it suffice to recall this same relation, but with more striking figures, which was found in our review of "Visceral approximation with absorbable plates,"<sup>1</sup> where 61 gastro-enterostomies performed with plates gave 14 deaths, a mortality of 22.95 per cent. Of these, 18 female cases resulted fatally only twice; mortality 11.11 per cent., less than one-half of the mortality of the operation.

*Resection ; maintained Continuity of the Canal.*—In 36 cases the continuity of the digestive tract was maintained after the resection, twice by an end-to-end approximation with the aid of the anastomotic button. Method 5: (a) Both cases completely successful; four times by a lateral anastomosis with absorbable plates. Method 4: Four successes; once by an invagination of the ileon into the colon. Method 1: (f) Also a success.

In the remaining cases, 29 in number, the continuity was established by immediate suture of ileon to colon. These comprise 11 of the fatal cases of resection of the neoplastic coil; their mortality is therefore 37.93 per cent. thus divided:

- Method 1.*—(a) Seven cases of suture of ileon to colon, the calibre being the same; resulted twice fatally; mortality 28.57 per cent.  
 (b) Three cases in which the ileon was cut obliquely to give a corresponding calibre, and sutured directly to the colon; all resulted successfully.  
 (c) Eight excisions or suturings of the terminal orifice of the colon to meet the smaller calibre of the ileon; gave four deaths; mortality 50 per cent.  
 (d) Eleven cases, the correspondence of calibre not indicated, with five deaths, would give the mortality 45.45 per cent.

The oblique incision of the intestine to equalize the calibre, if a difference exists, would appear to be the method of choice, as far as so limited a number of cases may be taken as an indication.

<sup>1</sup> ANNALS OF SURGERY, September, 1894.



Of this series, the entire mortality of thirty-six cases of continued permeability of the digestive canal is confined to twenty-nine operations by methods of suture.

*Continuity of Digestive Canal Interrupted.*—In nine cases of resection the surgeon terminated the first intervention with an artificial anus. Method 3 : Death was the rapid result in four cases ; mortality 44.44 per cent.

Of the five survivors, one was cured of his artificial anus by the enterotome applied at the moment of operation ; another, after an unsuccessful application of enterotome, continued existence with his uncomfortable infirmity ; three others underwent a second operation for the cure of the anus by secondary suture of the intestine. In one of these cases the suture failed entirely, and the patient was forced to live on in his miserable condition. The second reports the cure of the anus, but an abdominal hernia as a result of the laparotomy. The third is claimed to have recovered completely, but the report is too brief to be fully convincing to the effect of the claim.

Nothing, therefore, appears to authorize this interruption of the course of matter in the digestive canal. The statistics condemn such action as severely as the repugnance of the surgeon to create so distressing an infirmity (should) forbids its practice.

*Class II. Tuberculosis.*—Twenty-four cases of resection for tuberculosis are published by 14 surgeons. The sex noted in 23 reports gives 10 females, for 13 males. Twenty-one where the age is given ; average thirty-two years ; the youngest ten, the oldest fifty-four ; both males.

Twenty-four operations with 4 deaths fix the mortality at 16.66 per cent. The female mortality rests at *zero*. One death the sex not noted leaves the statistics with 11 males, of whom 3 died ; the mortality of the male 30.77 per cent.

Of the 24 resections of the tubercular cæcum, two operators terminated the intervention in establishing an artificial anus. *One* of these patients died the next day, the *post-mortem* showing an infiltration of faecal matter at the superior angle of the abdominal wound, the commencement of a suppurating peritonitis, causing the fatal result. The *second* case terminated by an artificial anus

survived the first operation to succumb to a later intervention, to cure the anus by a secondary suture; result fatal the second day following the operation; the cause of death not explained (Chaput).

The 22 remaining cases were treated by resection and immediate suture.

*Method 1.*—One operation without details; death (Richelot, cited by Baillet).

- (a) Fourteen cases with one death; mortality 7.14 per cent.
- (b) Two cases, of which one resulted fatally fourteen days after the operation; the intestinal suture, failing completely, allowed the establishment of a suppurating and stercoral fistula; symptoms of abdominal infection and death. The *post-mortem* revealed a general peritonitis with subdiaphragmatic abscess.
- (c) Three cases with three recoveries.
- (d) Two cases with two recoveries.

The proportion of one death in six operations is a low mortality for such resection of the intestine; but low as it is, it will be seen by the discussion of the operatory methods that one-half of the deaths in this class were the direct result of the faulty method employed. The other deaths, which were also due to peritonitis, once directly proven to be a result of insufficient suture; and the other case, probably due to the same cause, would allow the conclusion that resection properly conducted and terminated would give an unbroken series of success.

*Class III. Invagination; Cancerous Cæcum.*—Nine cases operated by eight surgeons with five deaths give a mortality of 55.55 per cent.

Of these cases three were females and six males. The average age 35.2 years; the youngest eight and oldest fifty-five years; both males.

*Method 4.*—One case, treated with absorbable plates, resulted fatally, the fault of the operator in not excising sufficiently the invaginated colon, resulting in gangrene, perforation, peritonitis, and death.

*Method 3.*—Twice an artificial anus was made; the patients recovering.

- (c) But one of them, submitting two months later to an operation of secondary intestinal suture to cure the anus, died four days afterwards. "Occlusion by band" (Barton).
- (d) The other artificial anus was operated by implantation of the ileon, aided with a rubber ring. The operation was unsuccessful; the stercoral fistula reappearing, and persisting about six months, but finally healing by slow granulation.

*Method 1.*—(a) Six cases treated by resection, and immediate suture gave four deaths; mortality 66.66 per cent.

One death the day following the operation attributed to shock. The surgeon (Von Baracz) declares that another time he proposes to use absorbable plates, should their claims be substantiated by the experiments he then undertakes (1891). Von Baracz is now a most ardent supporter of the use of absorbable plates, and his successful resection of the ileo-cæcal coil, published in July of 1894, will be found of great interest in comparison with this fatal case of the same surgeon using sutures in 1891.

One death is said to have been caused by gangrene of the intestine, escape of fæcal matter into the peritoneum, peritonitis with its fatal termination.

Another is declared due to general peritonitis, its cause not indicated (Czerny). We are inclined to accuse the intestinal sutures here, in spite of the affirmation that they were sufficient.

The fourth death resulted directly from the filtration of the intestinal contents through the lines of suture (Billroth).

To resume, in this series of nine operations five died within a few days, their death directly attributable to the intervention, a sixth died as the result of a second operation necessary to heal a distressing infirmity.

Of the three survivors two seem to have been radically cured at the end of three weeks; the third suffered with an artificial anus for six months, enduring to no avail the secondary suture which killed the companion case of this series, but he was finally relieved from his infirmity by the cicatrix formed by the granulation of the wound.

The line of action in cases of this class appears to be a generous resection, assuring healthy tissue, rapid and *secure* establishment of the continuity of the bowel. For of the nine operations the only two satisfactory results are found where the immediate and sufficient continuity of the intestinal canal was secured in sequence to the resection.

*Class IV. Chronic Invagination.*—Seven operations by five surgeons; two deaths; mortality 28.57 per cent.

Six cases report the age and sex. Average age 30.5 years; oldest fifty-two, youngest thirteen; both males. Three females, and the same number of males.

Of the two deaths, the sex of one is not noted; the other fatal case was a female.

*Method 1.*—(a) Six cases with five good results; one death from peritonitis; cause not given, but a suspicion of insufficient sutures is allowable.

One other case (Müller) resulted fatally. No details of this death are given by Sachs, from whose mention the report is drawn.

The immediate resection with establishment of perfect continuity would appear to be the operation for cases of chronic invagination. The dangers are strictly limited to faulty technique. Otherwise this intervention gives most satisfactory results.

*Classes V, VI, and VII.*—These classes comprise a number of cases so limited that any deductions would be weakly based on so little experience.

The treatment of acute invagination by an anus after resection, with secondary suture to establish the continuity, resulted in a perfect success (Wassilief). This treatment has been well proven for obstruction of the small intestine, and its success, in the only case of the kind involving the cæcal coil, goes far to recommend such procedure.

Three resections for cicatricial or inflammatory stenosis, treated by resection and immediate suture. Result perfect.

The same result follows the resection of the irreducible cæcum with immediate suture of the intestine.

*Classes VIII and IX. Stercoral Fistula.*—Three operations in each class; a total of six; one death (Köcher) by peritonitis, in which the insufficiency of the sutures might be incriminated.

Five successful results. One operation—*Method 5 b*—notes the efficacy of the anastomotic button. Another—*Method 1 (d)*—describes the implantation of the ileon, using the rubber ring proposed by Senn for invagination. The stercoral fistula

persisted for some time, but was finally completely stopped by another operation,—*Method 1 (e)*.

Three operations—*Method 1 (a)*—give two successes for the immediate suture. The third (Billroth) was sutured immediately after resection, faulty union, insufficient suture, re-establishment of the stercoral fistula on the fourth day, with accumulation of matter in the iliac fossa, necessitating another intervention. Result fatal.

To conclude: of the six operations, one with the anastomotic button gave a perfect result. Two immediate suturings of the intestine resulted favorably.

One implantation of the ileon into colon with the aid of a rubber ring was insufficient, and left the stercoral fistula for another operation with fatal result.

Four cases in which the continuity of the intestine was established by suture only give two good results; 50 per cent. of the cases were ultimately fatal, the mortality directly attributable to the use of sutures for the anastomosis.

*Class X. Pyostercoral Fistula.*—Six operations; the resection followed by immediate suture; two deaths. One (Billroth) on the second day; purulent peritonitis, sero-purulent infiltration at the site of operation. An insufficient suture may be supposed, though no mention of it is made in the report.

The second death (Dillner) followed the operation by four days; insufficient sutures, escape of faecal matter into the peritoneum, with consequent fatal peritonitis.

Of the four remaining cases, one (Billroth) left the hospital five weeks after operation, with a persistent suppurating fistula. In another (Billroth), eight days after the operation, the stercoral fistula reappeared, complicated with suppuration of the sutures. A second operation to cure the fistula, three months and a half later, terminated fatally sixteen days after this intervention. The *post-mortem* revealed a congestion abscess communicating with the fistula, necrosis of the vertebral column, pocket of suppuration next to the fifth lumbar vertebra. A third (Czerny) left the hospital at the end of a month completely cured, and five months later is reported in good health. The fourth (Czerny) showed

pus in the wound the fifth day after operation; a suppurating fistula persists. *Death*, one month later, said to have resulted from intestinal hæmorrhage, but no details are furnished.

Of these six operations for pyostercoral fistula only two patients ultimately survived. One of these was forced to support the slow process of granulation to obtain relief from the stercoral fistula. •

Six anastomoses by stitching proved the insufficiency of suture five times, four of which cases were ultimately fatal.

Of six operations to cure pyostercoral fistula only once did the operation effect a radical cure. The result is not brilliant. The reason may be attributed to the method employed.

The preceding review leaves for consideration several points of the operation which have their importance, and for the discussion of which sufficient data are found in the clinical reports. We refer to the *incision of the abdomen*, the *extent of resection* of the intestine, and the length of *time required for the operation*.

*Abdominal Section.*—Seventy reports describe the incision. Their variety is considerable.

Twice a lumbar incision was made. In each case a diagnosis of affected kidney determined this choice, and therefore this point of attack will not be discussed, although in one case (Gifford) the operation seems to have been terminated with sufficient ease. In the other (Hahn) a supplementary transverse incision was necessary to allow the completion of the intervention.

Twice the incision was made oblique in the direction of the line from the umbilicus to the anterior iliac spine or the middle of the arcade of Fallope. No reason for this incision is offered by the surgeons who operated thus. Its limitations are well pointed out by Dr. Baillet, and no advantage is apparently offered by this choice. •

The incision in sixty-six cases may be considered as of three varieties,—

(1) Median line, fifteen abdominal sections, once from sternum to pubis, three times from sternum to the umbilicus, and eleven times between the umbilicus and pubis.

(2) External border of the right rectus, twenty times, with

five incisions described as vertical to the middle of Fallope's arcade, that which corresponds so closely with the border of the rectus that these sections may be classed together.

(3) Twenty-seven incisions described as oblique from above downward parallel to the crural arcade at various distances from it. Three of these incisions are reported as descending on the anterior vertical line of the axilla, curving inward and downward at a distance of several finger-breadths above the anterior iliac spine.

*Discussion of the Incision.*—The median section rules in abdominal surgery. Its advantages are well known and indisputable; but does this incision allow easy manipulation in the right iliac fossa? Of the fifteen cases with reported median incision once the section from sternum to pubis was necessary for the successful termination of the resection. Five times the tumor was found above the umbilicus, and the extreme length of the meso allowed the operation by median section. In the remaining cases the manœuvres of ileo-cæcal excision seem to have been possible, but one of them (Broca) was so tediously accomplished that the resection had to be terminated by an artificial anus, which caused a fatal result.

A long mesentery with a meso-cæcum would allow operation with a median section, were there no pericæcal adhesions to be dissected in the iliac fossa. But there being no assurance of the existence of such a meso, and no indication in regard to existing adhesion, we would prefer an easier access to the ileo-cæcal region.

The vertical incision allows more immediate access to the iliac fossa, renders its dissection easy, but several operators are found to have extended the incision by preference in the direction of the line of the axilla, thus transforming it somewhat to the oblique, which follows.

Oblique section is noted most frequently, thus indicating its popularity. The curved variety descending on the line of the axilla, bending inward parallel to the crural arcade, follows well the situation of the ileo-cæcal coil in its normal position. This incision allows of great extension, easy access, and therefore

facilitates to the best degree the complicated manipulations necessary for resection in this region. Dr. Baillet brings out another argument in favor of this last incision. The section of the abdomen traverses three planes of contrarily-directed muscular fibres. Any incision must necessarily cut more or less obliquely at least two of these planes. The vertical section cuts *all three*, another argument for its rejection.

The length of the incision is of necessity variable with the habits of the operator, the indications of each particular case, the complications, and the method employed. In general a length of fifteen centimetres will not be found excessive. The oblique curved incision can be extended at will.

*Extent of Resection.*—Forty-four cases report the length of resected parts. Twenty-one give only the total length, not distinguishing the colon from the ileon. The average length of excised intestine is found to be 22.5 centimetres. Twenty-three cases distinguishing the length of colon and ileon give an average of 16.2 centimetres of excised colon, 11.8 centimetres of resected ileon.

It will be noted in the statistics of mortality that several fatal results are due to the fault of a too limited excision, a fact to be borne in mind, remembering especially that in cases of invagination *only extensive resection* has given good results.

The greatest length excised was 150 centimetres (Müller). Unfortunately the details of this operation with a fatal result are lacking, and no information in regard to the effect of the excision on the result can be deduced.

As might be expected, the cases of limited excision are found in interventions for cicatricial stenosis and tubercular trouble. Czerny reports the smallest resection, six centimetres of the colon with two centimetres of ileon.

*Length of Time Required for Operation.*—The time required for the operation varies with the complications, amount of adhesion, and the method employed.

Czerny reports a case of excessive duration. An operation having lasted four hours and a half terminated fatally a few hours later.



Thirty-two cases report the time occupied by the operation.

In four of these cases the continuity of the intestine was established by methods other than sutures, and they will therefore be considered separately.

The remaining twenty-eight cases give an average of two hours and five minutes.

One operation the continuity established with the anastomotic button was completed in one hour's time.

Three operations with visceral approximation with absorbable plates give an average of one hour and forty-five minutes.

In operations of this kind the saving of twenty minutes to an hour, that would appear possible by methods other than sutures, has a great importance.

*Results of Successful Operations.*—In our consideration of operatory methods, the condition of the survivors was noted as far as affected by the question of method only.

The clinical reports are, in general, silent as to the ultimate fate of the survivors of resection.

Twenty-nine successfully operated cases of neoplastic cæcum mention six instances of formation and persistence of a stercoral fistula, two of these fistulæ were left without treatment, enlarged ganglia indicating a rapid return of malignant disease three and four months later. One suppurating fistula (Billroth) ended in death in marasmus six months after operation. The *post-mortem* revealed the place of the cæcum and colon occupied by a curved canal scarcely permeable to the button of an enterotome, carcinoma of the intestine, secondary carcinoma of the peritoneal covering of the diaphragm, and a right hæmorrhagic pleural effusion.

One fistula cured by granulation.

Another was closed by secondary suture.

No mention of the obliteration of the sixth fistula is found, but the patient is mentioned six months later as in good health, with no trace of malignant disease.

Seventeen cases reporting a good condition after the operation, include three who left the hospital at the end of a month in

good health. One left at the end of seven weeks, in good condition. *Another* was victorious in an athletic contest some time later.

A good condition is noted for two cases at three months, one at five months, one at six months. *Another* at six months had gained twenty pounds in weight. A *third* is reported in excellent health six months later, having gained forty-six pounds the first two months that followed the operation. *One* patient died of recurring malignant disease (sarcoma) after six months' interval. *One* is reported well at four months, *another* at fifteen months, having gained sixty-five pounds. *Another* had increased in weight from 88 to 126 pounds. Matlakowski reports a patient well two years after operation. Rehn's case is reported to have died of the secondary invasion of malignant disease, three years and a half after the resection of the ileo-cæcal coil. These results are too limited to permit conclusions. The recurrence of malignant disease is noted four times, and only twice as the cause of death.

It is much to be regretted that so little information is given on this important question.

The frequency of stercoral fistula after *suturing* the intestine is here noticeable as another indication of the defective continuity obtained by this method.

Sixteen resections for tubercular infiltration note the results to some extent. *Two* patients were forced to support a persistent stercoral fistula at the time of leaving the hospital. *Five* other cases were complicated with stercoral fistulæ persisting from one to four weeks, one of them, a pyostercoral fistula was stopped after three weeks' time by the granulation of the wound, the patient leaving the hospital, ten weeks after the operation, in good health. *One* patient gained twelve pounds in nine weeks that followed the intervention, *two* are reported in good health after three months' time. *One* married fifteen months later. *One* case is mentioned well at three weeks, *another* at five months, *another* at one year, and still *another* at twenty months after operation. Czerny reports, three years after the intervention, a woman in good condition, cicatrix smooth, inguinal ganglia larger to the

right than to the left. Cervical ganglia and those of the axilla of increased volume. Diarrhœa, three passages *per diem*.

Enterorrhaphy sutures in seven cases of tubercular excision allowed the formation of a stercoral fistula.

The two cases of resection of the ileo-cæcal coil for chronic invagination, operated by Czerny and surviving the operation, are reported in good health, one four years and the other eight years after the surgical intervention.

The cases of resection for inflammatory and cicatricial stenosis report good health, and gaining weight from three weeks to four months after operation. Affections of this class resemble those of tuberculosis to such a degree that they might well be included under the same head. In both classes, the operation, successful, would reduce the prognosis to that of the general condition of the patient, other tubercular localizations, etc.

No report mentions any reappearance of tuberculosis in the ileo-cæcal region.

The only *post-mortem* which notes the narrowing of the anastomotic orifice is that of Billroth, operation for cancer, ileocolostomy with *sutures*, death in marasmus six months later, button of enterotome could not pass the orifice of the anastomosis, so great was the contraction.

TABLE I.—RESECTION OF THE ILEO-CÆCAL COIL FOR NEOPLASM.

	Surgeon.	Sex and Age.	Date of Operation.	Recovered.	Died.	TREATED BY RESECTION.			Remarks.
						Artificial Anus.	Secondary Suture.	Primary Suture.	
1	Anger.	F. 46	Sept., '93.	I	.	.	.	I	Cured by enterotome.
2	Barton.	F. 37	" '88.	I	.	I	.	.	
3	Bassini.	M. 22	April, '87.	I	.	.	.	.	
4	Billroth.	" 56	Sept., '81.	.	I	.	.	I	
5	"	" 54	Mar., '84.	I	.	.	.	I	Death; marasmus; 6 mos.
6	"	" 47	" '86.	.	I	.	.	I	
7	"	F. 43	May, '86.	I	.	.	.	I	
8	"	M. 46	" '86.	.	I	.	.	I	
9	"	" 38	" '89.	.	I	.	.	I	
10	"	" 54	Feb., '90.	I	.	.	.	I	
11	"	" 10	May, '90.	.	I	.	.	I	
12	Bramann.	F. 43	" . . . .	I	.	.	.	I	
13	Carmalt.	M. 44	" . . . .	I	.	.	.	I	
14	Czerny.	" 47	Sept., '82.	.	I	.	.	I	Fistula cured by 2d oper.
15	"	" 52	Jan., '87.	.	I	.	.	I	
16	"	" 48	Oct., '90.	.	I	.	.	I	
17	Dumont.	" 29	April, '93.	I	.	.	.	I	
18	Durante.	F. 56	" . . . .	I	.	.	.	I	
19	Ferguson.	F.	Dec., '93.	I	.	.	.	.	
20	Frank.	M. 36	Sept., '92.	I	.	.	.	I	
21	"	" 48	Jan., '93.	I	.	.	.	I	
22	Gilford.	F. 27	Feb., '93.	I	.	.	.	I	
23	Hahn.	M. 19	Aug., '86	I	.	I	.	.	Cured by enterotome.
24	Ilott.	F. 50	July, '93.	I	.	.	.	.	
25	Jones.	" 54	May, '84.	.	I	.	.	I	" Absorbable plates."
26	König.	M. 48	" . . . .	.	I	.	.	.	
27	Körte.	M.	Nov., '91.	I	.	I	I	.	" First resect'n of cæcum."
28	Kraushold.	M. 62	April, '79.	.	I	.	.	I	
29	Lawson.	" 40	Jan., '93.	I	.	.	.	.	" Absorbable plates."
30	Matlakowski.	" 67	Feb., '91.	I	.	.	.	I	
31	"	" 52	May, '89.	I	.	.	.	I	" Murphy button."
32	Maydl.	" 54	Aug., '82.	I	.	I	I	.	
33	Péan.	F. 28	Aug., '91.	.	I	.	.	I	
34	Rehn.	" . . .	" . . . .	I	.	.	.	I	
35	Riedel.	M. 51	Oct., '85.	I	.	I	I	.	" Murphy button."
36	Ruth.	" 5	" '93.	I	.	.	.	.	
37	Sacré.	F. 25	June, '87.	.	I	I	.	.	
38	Santovecchi.	" 50	Jan., '91.	I	.	.	.	I	
39	Sandler.	" 22	Aug., '93.	I	.	.	.	I	" Absorbable plates."
40	Senn.	M. 37	Oct., '89.	I	.	.	.	.	
41	Trombetta.	F. 40	June, '84.	.	I	I	.	.	" Absorbable plates."
42	Von Baracz.	M. 19	Aug., '93.	I	.	.	.	.	
43	VonBergmann	" 35	Dec., '84.	I	.	.	.	I	
44	Von Hofmolk	F. 24	" . . . .	I	.	.	.	I	
45	Whitehead.	M. 38	Oct., '84.	.	I	I	.	.	

TABLE II.—RESECTION OF THE ILEO-CÆCAL COIL FOR TUBERCULOSIS.

	Surgeon.	Sex and Age.	Date of Operation.	Recovered.	Died.	TREATED BY RESECTION.			Remarks.
						Artificial Anus.	Secondary Suture.	Primary Suture.	
46	Billroth.	M. 35	July, '89.	I	.	.	.	I	
47	"	" 34	" "	.	I	.	.	I	
48	"	" 39	Dec., '89.	I	.	.	.	I	
49	"	" 10	Feb., '91.	I	.	.	.	I	
50	Bouilly.	F. 44	Dec., '87.	I	.	.	.	I	
51	Broca.	M. 41	Mar., '92.	.	I	I	.	.	
52	"	" 12	Nov., '92.	I	.	.	.	I	
53	Czerny.	F. 34	June, '86.	I	.	.	.	I	
54	"	M.	Feb., '88.	I	.	.	.	I	
55	"	" 54	June, '90.	.	I	.	.	I	
56	"	F. 22	May, '92.	I	.	.	.	I	
57	"	M. 31	" "	I	.	.	.	I	
58	Frank.	" 32	July, '91.	I	.	.	.	I	
59	"	" 25	Mar., '92.	I	.	.	.	I	Stercoral fistula.
60	Gussenbauer.	" 34	May, '89.	I	.	.	.	I	
61	" & Fink.	" 27	Aug., '89.	I	.	.	.	I	
62	König.	F. 33	Dec., '91.	I	.	.	.	I	
63	Reclus.	" 22	Oct., '90.	I	.	I	I <sup>1</sup>	.	See Chaput, under stercoral fistula. <i>Death.</i>
64	Richelot.	" 27	" '93.	I	.	.	.	I	
65	"	"	Nov., '93.	.	I	.	.	I	
66	Roux.	F.	May, '90.	I	.	.	.	I	
67	Sachs.	" 41	Nov., '91.	I	.	.	.	I	
68	Suchier.	M. 32	" '87.	I	.	.	.	I	
69	Zahlmann.	F. 17	May, '92.	I	.	.	.	I	

<sup>1</sup> Death.

TABLE III.—RESECTION OF THE ILEO-CÆCAL COIL FOR INVAGINATION.

## INVAGINATION OF CANCEROUS CÆCUM.

70	Billroth.	F. 40	July, '88.	I	.	.	.	I	
71	"	M. 32	Mar., '90.	.	I	.	.	I	
72	Barton.	" 27	" "	I	.	I	I	.	Second suture. <i>Death.</i>
73	Czerny.	" 45	June, '84.	.	I	.	.	I	
74	König.	F. 21	" "	.	I	.	.	I	" Sarcoma." <i>Death.</i> Gangrene intestine.
75	Lauenstein.	M. 55	" "	I	.	.	.	I	
76	MacCormac.	" 36	Dec., '90.	I	.	I	I	.	" Implant'on rubber ring."
77	Senn.	F. 53	Nov., '89.	.	I	.	.	.	" Absorbable plates."
78	Von Baracz.	M. 8	Sept., '89.	.	I	.	.	I	" Sarcoma." <i>Death.</i> Col-lapsus.

TABLE III.—RESECTION OF THE ILEO-CÆCAL COIL FOR  
INVAGINATION.—(Continued.)

INVAGINATION—CHRONIC.

	Surgeon.	Sex and Age.	Date of Operation.	Recovered.	Died.	TREATED BY RESECTION.			Remarks.
						Artificial Anus.	Secondary Suture.	Primary Suture	
79	Boiffin.	M. 24	May, '92.	I	.	.	.	I	Resection of 150 centime- tres.
80	Braun.	F. 23	Jan., '92.	I	.	.	.	I	
81	Czerny.	" 36	July, '83.	.	I	.	.	I	
82	"	M. 52	Dec., '84.	I	.	.	.	I	
83	"	" 13	May, '88.	I	.	.	.	I	
84	Müller.	. . .	. . . . .	.	I	.	.	I	Resection of sixty centi- metres.
85	Rosenthal.	F. 35	May, '89.	I	.	.	.	I	

INVAGINATION—ACUTE.

86	Wassilief.	M. 25	Nov., '86.	I	.	I	I <sup>1</sup>	.		<sup>1</sup> Three times unsucces- fully. Finally cured by enterotome.
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TABLE IV.—RESECTIONS OF THE ILEO-CÆCAL COIL FOR STRICTURE  
AND FISTULA.

(a) For Stricture (inflammatory, cicatricial).

87	Hartmann.	F. 32	April, '93.	I	.	.	.	I		
88	Maydl.	M. 23	Mar., '87.	I	.	.	.	I		
89	"	F. 24	" '85.	I	.	.	.	I		Operation in two stages. The resection followed ileo-colostomy by one year's interval.

(b) Irreducible Cæcum in Hernia.

90	Clarke.	. . .	May, '93.	I	.	.	.	I		
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(c) Stercoral Fistula. Result of Operation.

91	Billroth.	M. 40	Nov., '88.	I	.	.	.	I		
92	Ferguson.	F.	Jan., '94.	I	.	.	.	.		" Murphy button."
93	Köcher.	M. 45	July, '83.	.	I	.	.	I		

TABLE IV.—RESECTIONS OF THE ILEO-CÆCAL COIL FOR STRICTURE AND FISTULA.—(Continued.)

(d) Stercoral Fistula. Result of Hernia.

	Surgeon.	Sex and Age.	Date of Operation.	Recovered.	Died.	TREATED BY RESECTION.			Remarks.
						Artificial Anus.	Secondary Suture.	Primary Suture.	
94	Davies-Colley.	M.	June, '91.	I	.	.	.	.	Implantation with rubber ring.
95	Doyen.	. . .	. . . .	I	.	.	.	I	
96	Milton.	M. 4.	. . . .	I	.	.	.	I	

(e) Pyostercoral Fistula.

97	Billroth.	F. 45	Nov., '88.	.	I	.	.	I	Insufficient suture. Fistula persists. Second operation May 3, '90. <i>Death.</i>
98	"	M. 26	Dec., '89.	I ?	.	.	.	I	
99	"	" 17	Mar., '90.	I	.	.	.	I	Insufficient sutures, allow fistula, but finally cured.
100	Czerny.	"	Dec., '91.	I	.	.	.	I	Insufficient suture. Fistula persists. Death, one month later, said to be due to intestinal hæmorrhagia.
101	"	" 31	Mar., '92.	I ?	.	.	.	I	
102	Dillner.	" 23	Feb., '82.	.	I	.	.	I	Insufficient suture. Escape of fæcal matter into peritoneum. Peritonitis. <i>Death the fourth day.</i>

## DEDUCTIONS.

Having finished the clinical review, tabulated its results, examined and classified the methods of resection of the ileo-cæcal coil, and noted the indications for this intervention, it may be well to put in concise form the justifiable conclusions which shall serve as a guide in describing as exactly as possible a regular methodical operation for the resection of the ileo-cæcal coil.

Excision of the cæcum should be attempted in every case of primary neoplastic tumor, where extensive infiltration of the vicinity or ganglia is not present to forbid the intervention.

Tuberculosis or inflammation localized at the ileo-cæcal coil should determine its resection in every case in which the immediate operation is possible without surpassing the patient's power of resistance, provided that other tubercular localizations be not so extensive as to render the advantage of this radical operation only temporary.

Examination of reports of tubercular cases leads to the hypothesis that operated appendicitis with unsatisfactory results—persisting fistula, repetition of accidents, induration, etc.—is amenable to resection. That primary excision of the ileo-cæcal coil would be less dangerous than and preferable to excision for fistula. A careful diagnosis should therefore be made to determine this point before operating.

Invagination in the region of the cæcum is frequently complicated with cancerous disease and in any case of resection, the excision should be extensive to assure the result.

The longer the time that separates the actual condition of the parts from a state of acute inflammation, the better are the results of the operation assured.

Fistula of the ileo-cæcal coil can safely be treated by resection, if no extensive suppuration has invaded, nor be allowed to enter, the iliac fossa.

An irreducible cæcum may be excised with safety.

After resection, in all cases, the continuity of the digestive tract must be immediately established and secured against leakage. The only exception might be made for acute obstruction.

The continuity has been sought by uniting the intestine, with sutures, with a lateral anastomosis with absorbable plates, with a terminal or lateral implantation of the ileon into colon, best effected with the anastomotic button.

The greater part of the mortality of resection of the ileo-cæcal coil is directly imputable to the insufficiency of the sutured intestine. Many of the recoveries show the leakage of intestinal contents through the line of sutures, by the formation and persistence of stercoral fistulæ.

The length of time required for operation is maximum for sutures.



With the exception of a fault of too little excision, not a reproach is found for resection followed by ileo-colostomy with absorbable plates or with the anastomotic button.

These last two methods have time-saving advantages.

These statements correspond with the results of the plates and buttons elsewhere demonstrated.

The conclusion is, therefore, justifiable that sutures are not to be used for establishing the continuity of the digestive tract after resection of the ileo-cæcal coil.

The use of absorbable plates and of the anastomotic button will be described for the ileo-colostomy of this operation.

*Preparation of Patient.*—The preparation for resection of the ileo-cæcal coil is often possible, the operation being rarely necessary for occlusion already complete. The patient can, therefore, benefit by a milk diet continued for several days, mild but repeated purgation to assure the vacuity of the intestine, the contents of which may be rendered aseptic by the administration of naphthol or other intestinal antiseptics.

The general condition of the subject for operation should be attended to.

The intervention decided upon, the abdomen is prepared for laparotomy in the usual manner.

*Anæsthesia* obtained by the successive action of ethyl bromide and chloroform will be found to be the most rapid and to cause the least discomfort to the patient before and after operation. The subject should be brought into the operating-room already anæsthetized.

*Operation.*—After assuring the asepsis of the region with a toilet and sterilized compresses, incise the abdomen, commencing in the vertical anterior line of the axilla, at a small distance below the costal border if a large wound is desired, otherwise at a point lower down.

With a sharp scalpel cut boldly down through the skin and cellular tissue, curving the incision downward and inward, passing at a distance of two to three finger-breadths above the anterior iliac spine, paralleling the crural arcade, to terminate the cut at the point of intersection with the imaginary vertical line to the

middle of Fallope's arcade. Deepen the wound regularly, passing the knife the entire length of the incision with each repeated cut, dividing methodically the muscular layers until the peritoneum is exposed intact in the wound. Complete the hæmostasis with the application of pressure forceps and careful sponging.

With a toothed forceps pick up a transverse fold of peritoneum. Assured that nothing but peritoneal tissue is gripped, an aid takes up the same fold, seizing it with a hæmostatic forceps at a slight distance from the first hold, which is still maintained while the point of the knife delicately cuts the fold, thus held up, to allow the insertion of the blunt-pointed scissors. The aid releases his grip on the fold, placing the hæmostatic forceps on the edge of the incised peritoneum, one branch on the interior surface, the other external. The same manœuvre is accomplished by the surgeon, changing the toothed for a pressure forceps. The point of the scissors introduced by the small peritoneal incision, the edges of which are held up by the forceps, accomplishes the complete section of the tissue without danger, especially if care be taken to cut between two fingers slid under and raising up the peritoneum.

The wound held open with spreaders shows the omentum frequently adherent in the cæcal region. Break carefully these adhesions and push the omentum to the left, thus exposing the ileo-cæcal coil. If the meso-cæcum exists and its length together with the absence of adhesion allows manipulation outside of the abdomen the operation is greatly facilitated. Otherwise, as is more frequently the case, the natural—short or absent meso-cæcum—or pathological fixation of the coil must be overcome. Descending the ileon to the extreme of free and healthy tissue, empty, and secure against reflux of contents, about fifteen centimetres of the small intestine, by ligating with gauze bands, or by clamps. Surround the parts with aseptic towels and section the small intestine between the two ligatures, close to the inferior band or clamp. Take care that the appendix be not cut by the section of the small intestine; its frequent position in the angle of the coil exposing it to this accident which, if unseen, might

determine a peritonitis. The superior end of the sectioned small intestine is covered with a towel and maintained by an aid.

The operator holding the cæcum with its adjoining section of small intestine, liberates carefully the adhesion of the cæcal coil in the iliac fossa, directing with the fingers and knife, preferably from below upward, commencing with the external side of the cæcum. In this way the entire mass is detached. It may be necessary to remove portions of the iliac fascia because of the extensive adhesion. Continue to detach the parts until the point of proposed section of the colon is reached. The coprostasis is then obtained in the manner described for the ileon. The parts are surrounded with aseptic towels, and the section of the colon is accomplished, close to the band placed nearest the cæcum. The ileo-cæcal coil is alone held by the mesentery, which is sectioned after placing two clamps in V position to secure the hæmostasis temporarily. The coil is now completely detached and removed. Ligate the mesentery included in each clamp, with the double interlocking thread employed for a pedicle. Remove the clamps by cutting the tissue close to their edge of compression. The extirpation of any remaining ganglia, that may be necessary, will be accomplished by careful dissection of each gland to avoid interference with the blood-supply of the neighboring intestine.

Secure all bleeding points in the iliac fossa, or of the resected mesentery. Bring the cut end of the colon out of the abdomen. Protect the peritoneal cavity and proceed to the ileo-colostomy.

Two methods will be described:

- (a) Lateral anastomosis with absorbable plates.
- (b) Lateral implantation with the aid of the anastomotic button.

A. Close the ends of the ileon and colon, by overhand stitch with a running thread traversing all the coats of the bowel. Invert the stitched ends into the lumen and maintain this position by a row of sero-serous sutures. Parallel the ileon to the colon, the ends of both viscera directed downward.

At a distance of from three to five centimetres from the extremity of the ileon incise the bowel opposite its mesentery

insertion longitudinally, of sufficient length to admit when slightly stretched the smaller diameter of the plate (three centimetres), which is slid into the intestine, using no force. The position adjusted, pass the needles of the lateral threads through all of the intestinal coats at opposite points, half-way from the extremities of the incision, and near to the edge. Place the terminal threads in the respective angles of the cut. Cover all with a towel and pass to the colon, into which a plate is fixed in the same manner. The incision of the bowel may give rise to a slight hæmorrhage, easily arrested by momentary compression. Complete the toilet of the parts. Scarify lightly the serous surfaces to be approximated. Bring the plates together, tie the posterior threads, secure each terminal knot, and, lastly, tie the anterior threads. Draw each knot to assure complete contact, but not tight enough to cause any interference with the circulation of the intestinal coats included in the area of the plates.

Cut the threads close to the knots, which are pushed between the plates with a director. Assure, by careful inspection, that the edges of the intestinal wound are entirely concealed between the coapted surfaces.

A few supplementary sero-serous sutures may be placed along the border of the plates to prevent slipping and assure the mind of the surgeon if he doubts the absolute continuity obtained by threads alone.

The approximation is complete. The toilet and reduction of the parts bring us to the closure of the abdomen, which will be described after the next method of ileo-colostomy.

*B. Implantation; Anastomotic Button.*—The end of the ileon anastomosed with the side of the colon, the end of which is closed by sutures, was adopted by Billroth as a means of reproducing a cæcum, and thus retaining a normal condition. Whether there is any advantage in this procedure *using sutures* the statistics fail to demonstrate.

The implantation is easily and rapidly accomplished with the aid of the anastomotic button, and would be preferable to an end-to-end approximation with the same instrument, for it avoids the inconvenience of adjusting the calibre and drawing in the colon

without puckering about the button, thus causing a difficult approximation.

Resume the operation after excision of the ileo-cæcal coil. The end of the ileon is overlapped with a running thread, as indicated in the *modus operandi* of end-to-end union with the anastomotic button. The thread in position, insert the male half of a medium-sized button, draw up the thread, and with it the end of the bowel which is gathered and secured about the central metallic cylinder with a double knot. Cut the threads closely.

Close the end of the colon with inversion and sutures, as described for lateral anastomosis. Parallel to the axis of the colon, at three centimetres from the extremity, pass the loop of silk thread necessary to U, the proposed line of incision. Incise the bowel at this point for a sufficient length—two-thirds the diameter of button—to allow the insertion of the vertically-inclined half of the button which contains the spring attachment. Maintain the compression of the spring bowl with the forceps, a branch on each bowl, internally and externally holding them together. Seize the cylinder of the button with another forceps and let go with the first pair as the U-thread draws the bowel up around the cylinder where all is fixed in knotting the thread, the ends of which are closely cut.

Bring the halves of the button together, assuring by a close inspection that the edges of the bowel are entirely within the circumference of the bowls. Press the button to obtain a compression sufficient to cause the desired atrophy. Remove the bands or forceps from the intestine, together with all towels. Complete the toilet and reduce the parts to their normal position.

*Closure of the Abdomen.*—Spread out the omentum over the parts and close the abdomen, sewing the peritoneum with lock-stitches of fine silk, the muscular sheath with running silk thread, and the skin with spaced sutures of silkworm gut or wire. Aseptic dressing, during the preparation, of which the patient should have recovered consciousness.

Aside from a special indication no drainage should be attempted. The clinical cases frequently show its uselessness as a safeguard, and its rôle in forming fistula is well known.

*Complication.*—The dissection of adhesions in the iliac fossa has several times exposed the iliac vessels, without occasioning any trouble whatever. Once the ureter was cut and determined an immediate nephrectomy. The fatal result of this case (Czerny) does not appear to be in any way attributable to this accident, of which a warning is sufficient to prevent its recurrence. The complications that may follow the operation are especially those of insufficient continuity which, *frequent* with the use of suture methods, should disappear with their abandonment.

*Post-Operatory Care.*—The operation in itself rapidly reduces the danger of shock, and a particularly favorable condition may be expected where the successive anæsthesia has been used. The patient should be warmly covered in bed, warmed by applied heat, and carefully watched. There is rarely any nausea after successive anæsthesia. A little champagne may be given the following day, to be followed by the administration of milk in small quantities, and other liquid and easily assimilated food. It will be remembered that alimentation can safely be much more rapidly resumed after ileo-colostomy by plate or button methods than when sutures were depended upon. The advantages of prompt nutrition have been exposed in cases of gastro-enterostomy with absorbable plates. What was said there need not be repeated here. But for ileo-colostomy rectal alimentation should not be tried. The nursing, dressing, etc., is that of any laparotomy.

#### UNPUBLISHED CASES.

In our general considerations the statement was made that no mention of surgical intervention of this kind for tubercular trouble was found in other than German and French publications.

Our inquiry has, however, succeeded in discovering a case of resection of the ileo-cæcal coil for tuberculosis, which has not been published. Through the kindness of Dr. Beck, of Chicago, the surgeon of this case, the following details have been obtained, and their publication, it would seem, constitutes the first mention of ileo-cæcal resection for tubercular trouble to be found in this country.

CASE *Tuberculosis Valvulae Ileo-Cæcalis; Pericæcitis; Adhesion; Resection; Ileo-Colostomy; Circular Enterorrhaphy; Recovery.*—The patient, a woman, thirty-one years old, with tubercular history, had always been healthy, until March, 1891, when she consulted Dr. Beck, complaining of a heavy pain in the right hypogastric region, diarrhoea, the stools bloody.

An examination revealed induration in the region of the cæcum, with pericæcal infiltration surrounding the peritoneum. A defined tumor could be distinguished.

*Operation.*—By an oblique incision passing above the anterior iliac spine, inward and downward parallel to the crural arcade, the abdomen was opened, allowing the dissection of the infiltrated mass formed by the diseased ileo-cæcal coil. The resection accomplished, the ileo-colostomy was performed with sutures.

After the operation the temperature remained normal for some time, the progress of the patient without notable incident, when a swelling above the incision was noted. This developed and opened, gave a discharge of greenish pus, in which some of the sutures were found. After discharge the fistula closed rapidly, and the patient recovered completely.

At the present time, September, 1894, the woman is living in Iowa, working regularly, and enjoying fairly good health.

The examination of the excised specimen showed tubercular infiltration of the valvula ileo-cæcalis with pericæcal adhesions.

Since this operation Dr. Beck has abandoned the use of sutures for the ileo-colostomy, and has again resected the ileo-cæcal coil, this time for cancer. The intestinal anastomosis was made with the aid of the button. Details of this successful case will be published later, the operation being still so recent that many interesting points could not now be given.

These two unpublished reports of ileo-cæcal resection should be added to those of the table, and thus the mortality in each class be lessened by the additional success.

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